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(54) Title: TIMING ADJUSTMENT CONTROL FOR EFFICIENT TIME DIVISION DUPLEX COMMUNICATION

BASE STATION
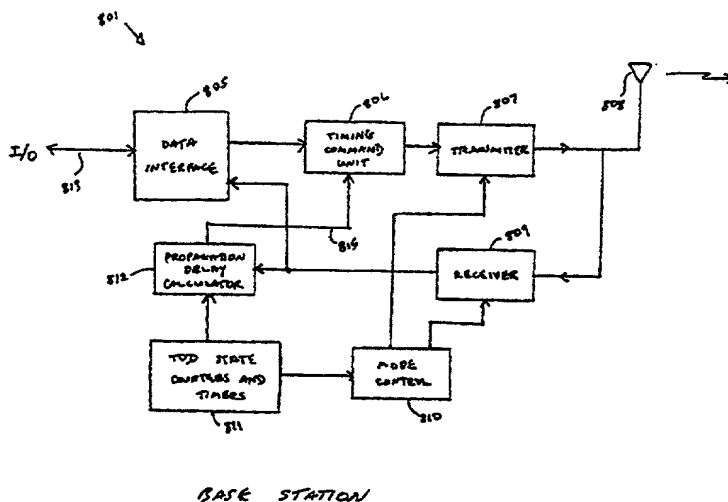
(57) Abstract

A system for time division duplex communication over a single frequency band wherein guard time overhead is reduced by active adjustment of reverse link transmission timing as a function of round trip propagation delay. Responding to a polling message from the base station, a user station seeking to establish communication transmits a reply message. The base station using a propagation delay calculator (812) calculates the distance of the user station by measuring the propagation delay with respect to receipt of the reply message and a timing control unit (806) and transmitter (807) for sending a timing adjustment command to the user station instructing it to advance or retard its timing. Thereafter, the base station monitors the user station transmissions and periodically commands it to adjust its timing in a like manner. The user station transmits a control preamble at the start of each time slot to allow the base station to perform round trip timing calculations and adjustment of the user station's power or antenna selection.